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PENTACERATOPS

***Pentaceratops* was a magnificent dinosaur with three horns, two long cheek spikes and a large neck frill.**

Pentaceratops only had three real horns, one above each eye and another on its snout. It appeared to have two other 'horns' – one sticking out of each cheek. But these were actually spikes at the bottom of its long neck frill. Other ceratopians also had similar cheek spikes.

FANCY FRILL

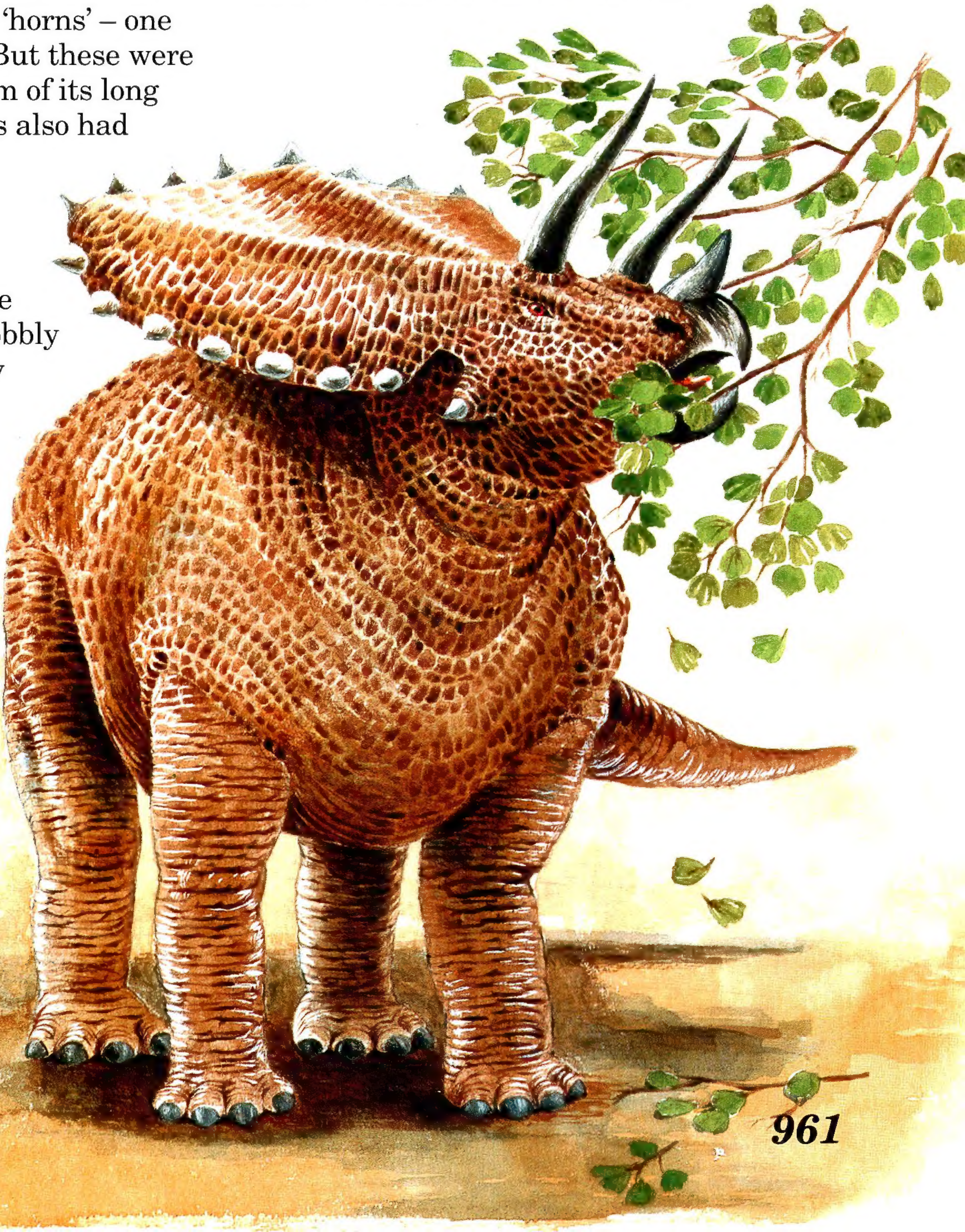
Pentaceratops had a very decorative frill. All along the edge there was a row of knobbly bones which created a fancy border. The frill gave *Pentaceratops* an added attraction in the mating season. The bony border probably also provided an extra defence against predators that wanted to sink their teeth into the fleshy part of *Pentaceratops'* neck.

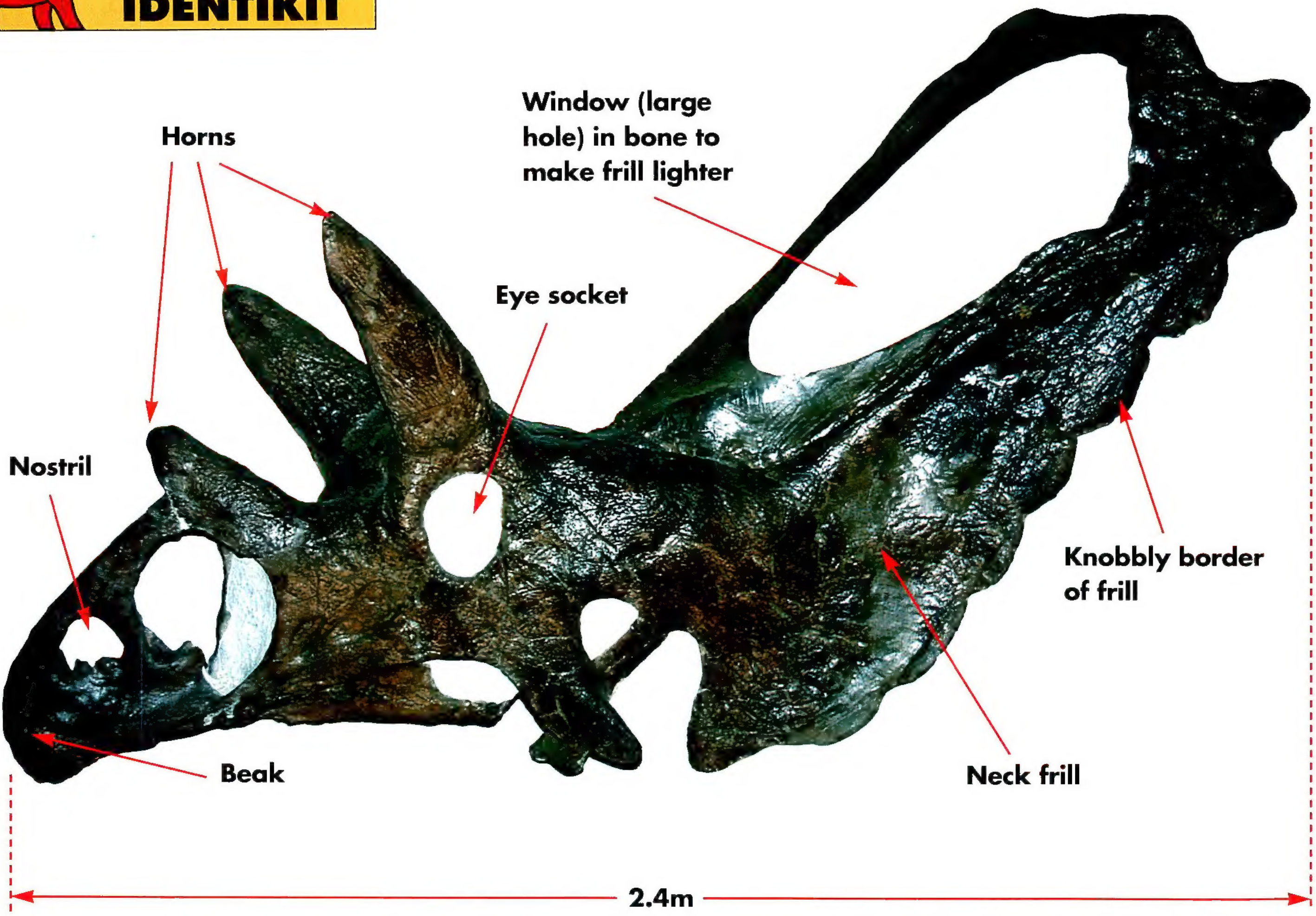
BE WARNED

Sometimes *Pentaceratops* used its amazing frill to warn other dinosaurs. A ball and socket joint connected the head to the neck so the head moved easily.

HEAD SWINGER

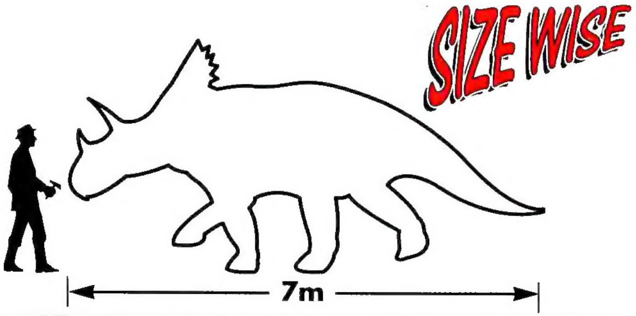
Looking at *Pentaceratops* head on was menacing enough but when it began to move its great frill about, it must have been truly terrifying. By nodding its head up and down and swinging it from side to side, *Pentaceratops* probably scared off all but the most determined rivals.





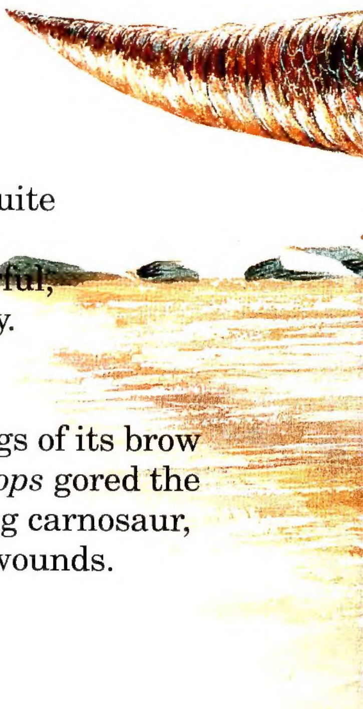
MONSTER FACTS

- **NAME:** *Pentaceratops* (pen-ta-ser-a-tops) means 'five-horned face'
- **SIZE:** up to 7m long
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in the San Juan Basin of New Mexico, USA



LOCKED HORNS

If *Pentaceratops* entered into direct combat, it probably locked horns with a rival. With their front legs held slightly apart for stability, the two dinosaurs pushed and tussled with each other until the weaker one gave up.



MUSCULAR LEGS

Pentaceratops was able to deal with large predators quite effectively. It had muscular legs which were very powerful, just like a rhinoceros' today.

DEADLY PRONGS

With the three deadly prongs of its brow and nose horns, *Pentaceratops* gored the soft underbelly of a towering carnosaur, inflicting deep and deadly wounds.

IT'S A FACT

LONG-FRILLED AMERICANS

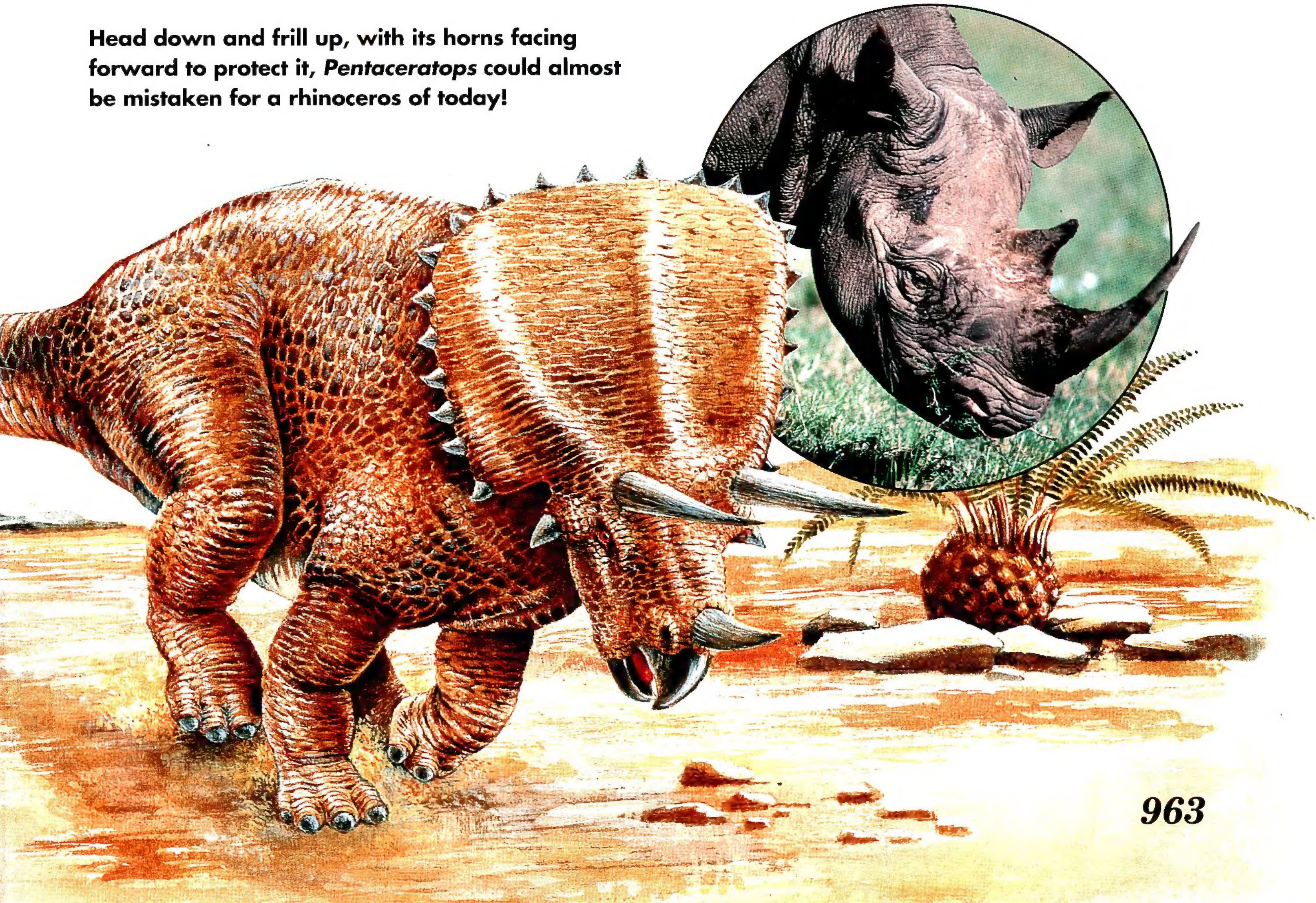
All the long-frilled ceratopians that have been found so far come from the Late Cretaceous Period of North America. Experts think this was due to the fact that these horned dinosaurs arrived at a time when the world was changing. The land link between North America and Asia was broken and the ceratopians could no longer move from one continent to the other.

TONGUE IN CHEEK

Pentaceratops had a large stomach supported by strong ribs. It took a lot of food to fill it! *Pentaceratops* browsed among low-growing plants and poked among the greenery with its long head. With its sharp, horny beak it slashed and cut long-stemmed palm fronds. It used its tongue and cheeks to push the plant food against its teeth over and over again until it was finely sliced and easily digested.

BIG WINDOWS

Like its long-frilled relatives, *Pentaceratops* had large holes or ‘windows’ in the bone of its frill. The windows made the frill lighter and easier to live with. When *Pentaceratops* lowered its head, its frill stood up and made the animal look even more frightening.

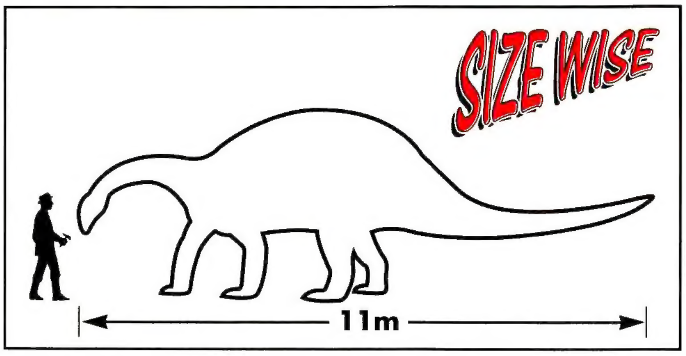


Head down and frill up, with its horns facing forward to protect it, *Pentaceratops* could almost be mistaken for a rhinoceros of today!

RIOJASAURUS

***Riojasaurus* was a giant prosauropod, as long as a tennis court is wide.**

Experts think that *Riojasaurus* probably travelled in herds for protection. Unlike smaller prosauropods such as *Plateosaurus*, *Riojasaurus* could not rear up on its hind legs. It trundled along on four heavy limbs, unable to make a quick getaway from fierce carnivores like *Saurosuchus*.



MONSTER FACTS

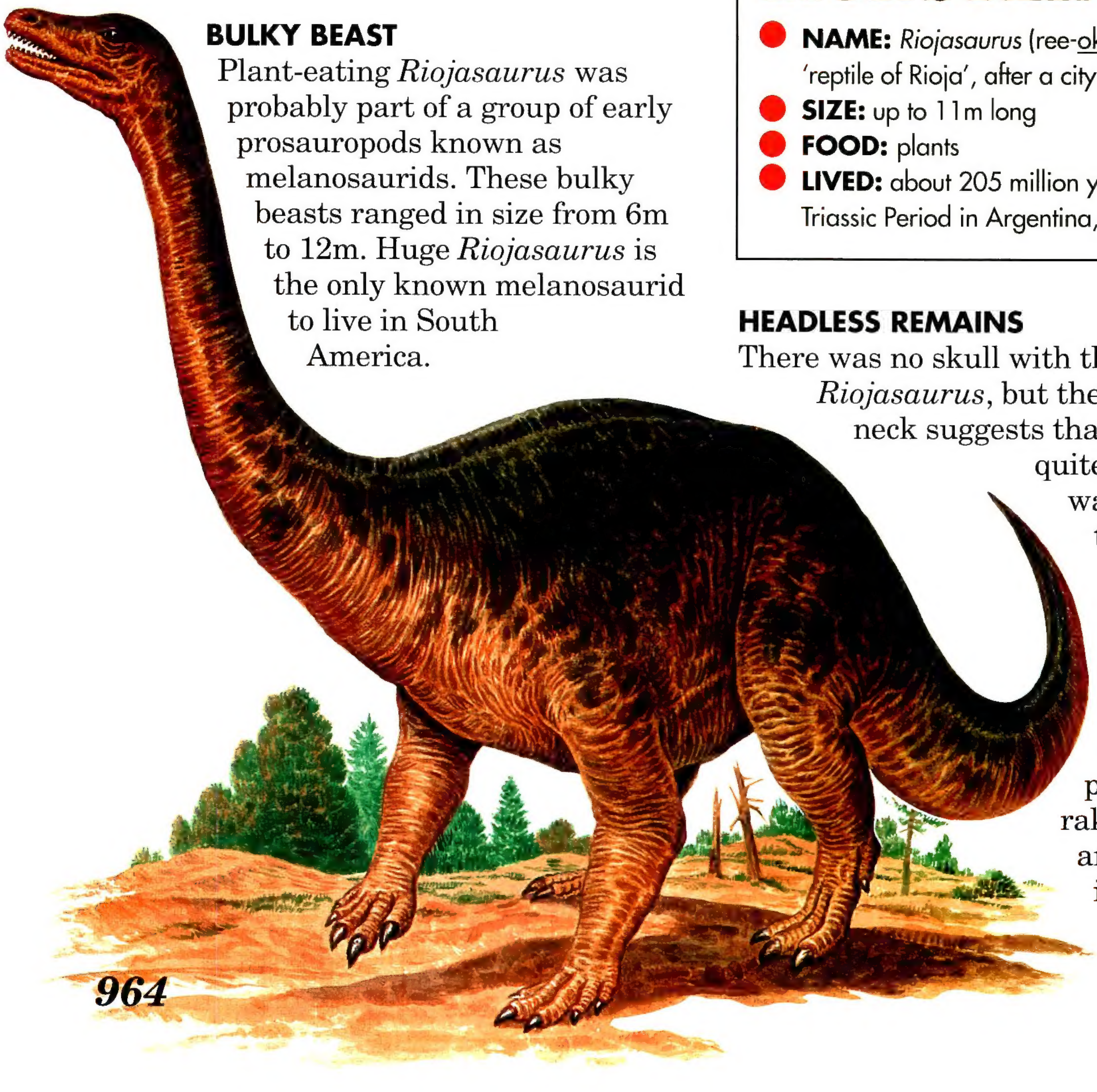
- **NAME:** *Riojasaurus* (ree-ok-ah-saw-rus) means 'reptile of Rioja', after a city in Argentina
- **SIZE:** up to 11m long
- **FOOD:** plants
- **LIVED:** about 205 million years ago in the Late Triassic Period in Argentina, South America

BULKY BEAST

Plant-eating *Riojasaurus* was probably part of a group of early prosauropods known as melanosaurids. These bulky beasts ranged in size from 6m to 12m. Huge *Riojasaurus* is the only known melanosaurid to live in South America.

HEADLESS REMAINS

There was no skull with the skeleton of *Riojasaurus*, but the long slender neck suggests that its head was quite small. As it wandered through the Triassic forests, *Riojasaurus* probably fed on the foliage of tall conifers and monkey-puzzle trees, raking off leaves and needles with its weak, spoon-shaped teeth.



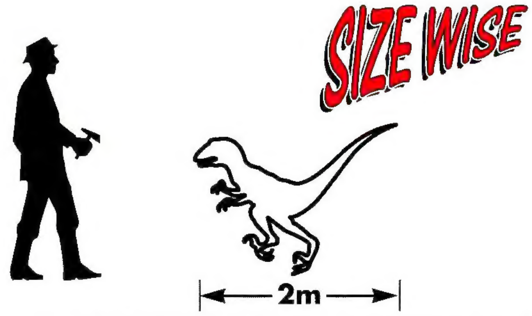
ADASAURUS

***Adasaurus* was probably related to the savage carnivore, *Velociraptor*.**

About as long as a large dog, *Adasaurus* was an intelligent, fast-moving predator. It could keep up with the scuttling speed of small creatures such as lizards and tiny mammals. Holding its tail out stiffly behind for balance, it sprinted along on two legs.

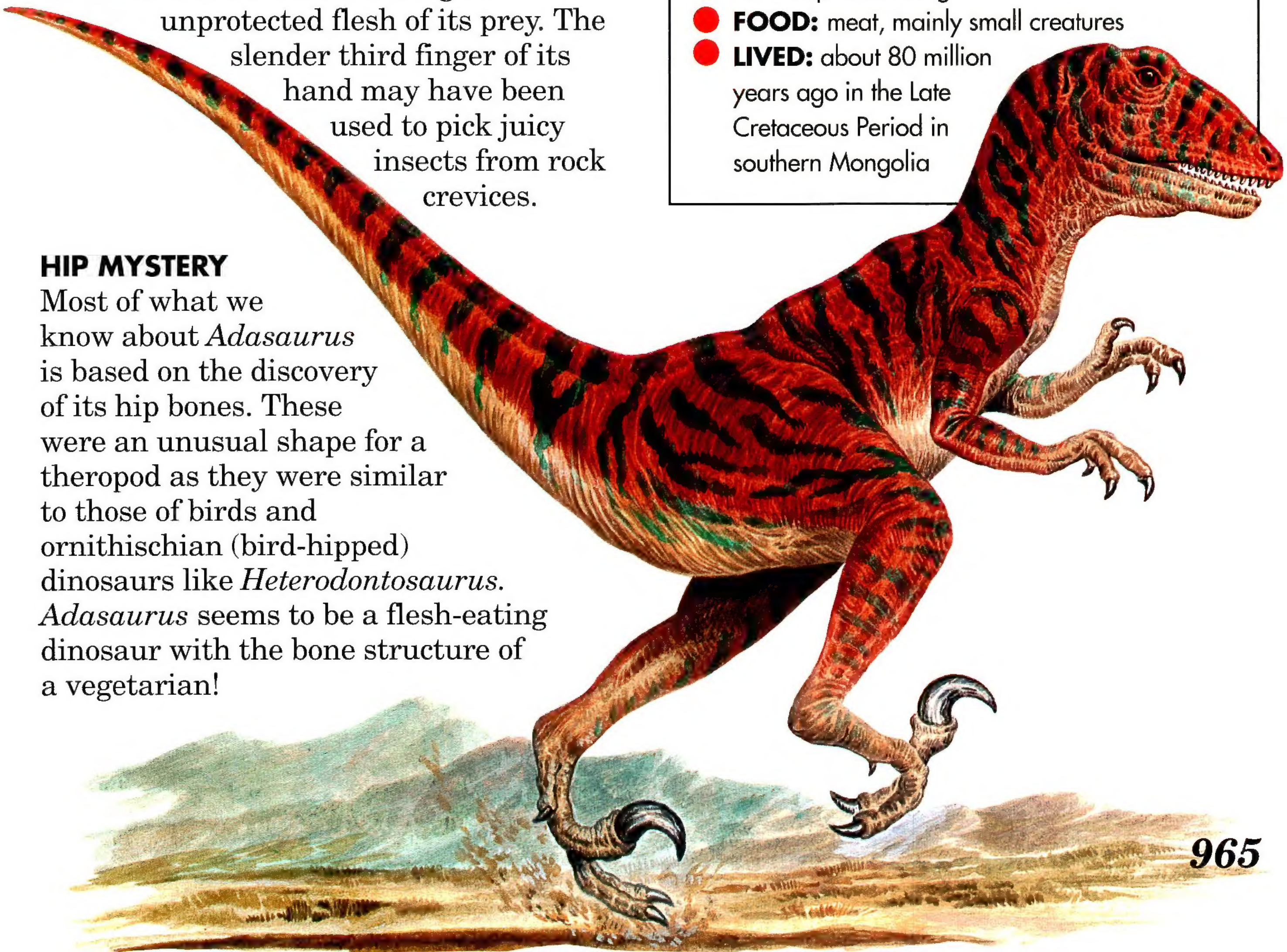
KILLER CLAW
Adasaurus had a short, switchblade claw on each foot used for slashing the unprotected flesh of its prey. The slender third finger of its hand may have been used to pick juicy insects from rock crevices.

HIP MYSTERY
Most of what we know about *Adasaurus* is based on the discovery of its hip bones. These were an unusual shape for a theropod as they were similar to those of birds and ornithischian (bird-hipped) dinosaurs like *Heterodontosaurus*. *Adasaurus* seems to be a flesh-eating dinosaur with the bone structure of a vegetarian!



MONSTER FACTS

- **NAME:** *Adasaurus* (add-a-saw-rus) means 'Ada (demon) reptile'
- **SIZE:** up to 2m long
- **FOOD:** meat, mainly small creatures
- **LIVED:** about 80 million years ago in the Late Cretaceous Period in southern Mongolia



Dinosaur ecology

Ecology looks at how animals and plants live together in their surroundings. The ecology of modern animals tells us a lot about dinosaur ecology.

When scientists rebuild a dinosaur's body, they study its fossils and compare them with what they know about today's animals. In the same way, to work out a dinosaur's ecology, they use information about today's animals and plants.

PLACE AND TIME

Let's look at the ecology of North America today, and then work backwards 150 million years, to guess at the ecology of North America in Jurassic times.

NORTH AMERICAN PRAIRIES

In North America today there are vast grasslands, known as the prairies. There are short, warm summers and cool winters. Just enough rainfall keeps the grasses and other plants growing. Ecologists (scientists who study plants and animals) looked at prairie food webs to find out who eats what. They begin with the plant-eaters.

HOME ON THE RANGE

The most fascinating plant-eaters are the pronghorns. They are antelope-type creatures that are well suited to prairie life. In summer they eat grasses and wild flowers. In winter they feed on bushes such as sagebrush, and, of course, more grasses.

RECORD-BREAKING RUNNERS

Pronghorn live in small groups and wander where the grazing is best. They can survive on the moisture in plants without needing to drink. In dry times, they even eat spiny cacti and farmers' crops. There are few places to hide on the prairies. To escape from predators, pronghorns have to run. They can run at 70 – 80km/h for several kilometres, and jump 8m in a single bound.

PRAIRIE PLANT-EATERS

Vole

Pronghorns

Some of the North American animals that eat the plants that grow under the prairie sun today. Pronghorns (bottom left) and jackrabbits (near left) compete for the same food. Both are prey for meat-eaters like the coyote and puma, as are smaller animals like the meadow vole (top left).

COMPETITORS AND PREDATORS

Ecologists found that pronghorns share the prairie plants with jackrabbits, bobtails, white-tailed deer and bison. So do the farmers' sheep and cattle on the vast ranches. Pronghorns have their enemies, too. Carnivores (meat-eaters) on the American prairies include bobcats, golden eagles, wolves, pumas (or mountain lions) and the night-howling coyote.

HHH-OOO-WWW-LLL!

Coyote are a modern success story. Their numbers are rising because these wild dogs can adapt in several ways. They can live on the prairies, and also in forests, hill country, and even in cities. And they eat almost anything, from rabbits, mice and voles, to insects, birds, fish, beavers, farm animals, dead animals, fruits, nuts, shoots – and of course, pronghorns.

HUNTING AS A TEAM

Ecologists have also found that coyotes often live in groups. They communicate by yips, howls, and body postures. Where pronghorns are common, coyotes form hunting packs. The pronghorn races off as soon as it sees them. One coyote chases it. When this coyote tires, another takes over. Working like a relay team, they tire out the pronghorn, then move in for the kill.

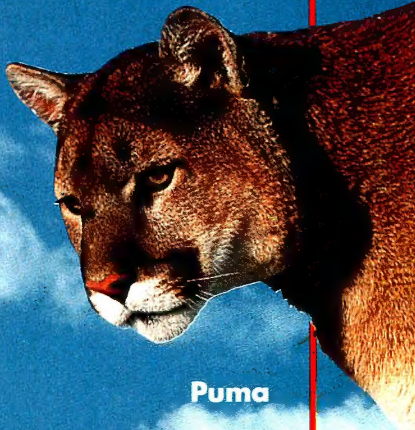
BACK TO THE JURASSIC

Information about different animals helps us to understand how they live together on the North American prairies today. It also helps us to build a picture of life in the same area around 150 million years ago.

PRAIRIE MEAT-EATERS

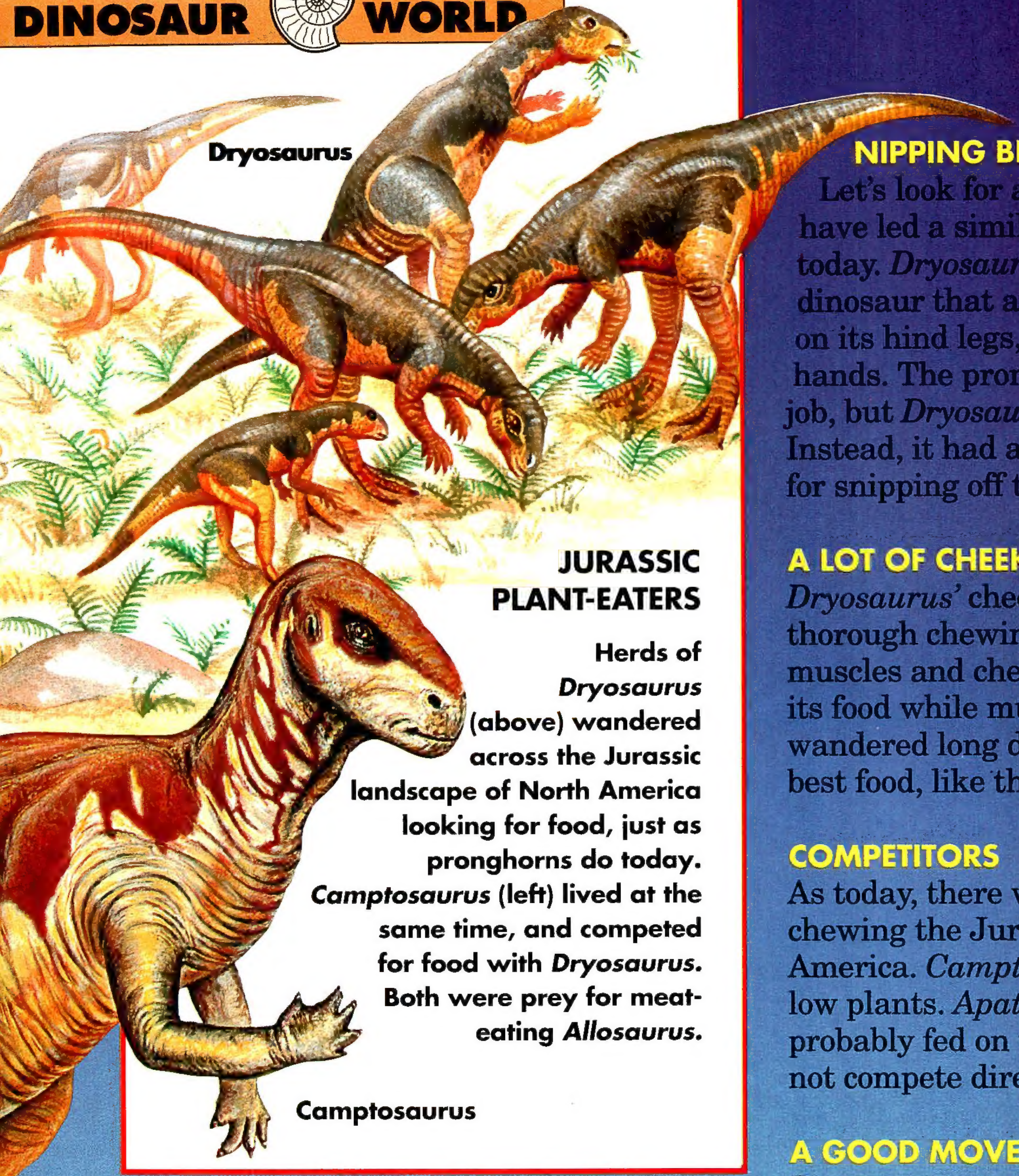
The carnivores that hunt on the North American prairies today include the fierce-beaked golden eagle (below left) and the powerful puma (below right). Although the coyote (bottom) eats small plant-eaters and dead animals, a pack of coyotes working together can bring down a pronghorn.

Eagle



Puma

Coyote



JURASSIC PLANT-EATERS

Herds of *Dryosaurus* (above) wandered across the Jurassic landscape of North America looking for food, just as pronghorns do today. *Camptosaurus* (left) lived at the same time, and competed for food with *Dryosaurus*. Both were prey for meat-eating *Allosaurus*.

BUILDING UP A PICTURE

People who study the ecology of the distant past are called palaeoecologists. They examine fossils – not just of dinosaurs, but of all the animals, and the plants too. Like detectives, they follow up many clues. Bones, teeth and droppings show what animals ate. The shapes of their bodies and legs show how they moved and how fast. Horns and armour show how they defended themselves. Tracks and nests show if they lived in groups and if they cared for their babies. The fossils of leaves and seeds tell us which plants lived in the area, and what the weather was like.

NIPPING BEAKS

Let's look for a herbivore that might have led a similar life to the pronghorns today. *Dryosaurus* was a hypsilophodont dinosaur that ate tropical plants. Standing on its hind legs, it grasped them with its hands. The pronghorn uses its lips for this job, but *Dryosaurus* did not have lips. Instead, it had a sharp, horny beak for snipping off the best bits.

A LOT OF CHEEK

Dryosaurus' cheek teeth were ridged for thorough chewing. It had strong jaw muscles and cheek pouches to keep in its food while munching. It probably wandered long distances to find the best food, like the pronghorns today.

COMPETITORS

As today, there were plenty of herbivores chewing the Jurassic plants in North America. *Camptosaurus* fed on tough, low plants. *Apatosaurus* and *Diplodocus* probably fed on taller trees, so they did not compete directly with *Dryosaurus*.

A GOOD MOVER

Dryosaurus was 2m tall and 3 – 4m long. It had the long, powerful back legs of a sprinter, and a stiff tail to balance its body as it twisted and turned. Like the pronghorn, it was a fast mover, to escape from predators. Not pumas or coyotes, of course, but huge-fanged *Allosaurus,* or smaller, swift *Ornitholestes.*

In Jurassic times, there were no grasses, and no flowers. But there were ferns, cycads, horsetails (right), and tree-ferns for the herbivores to eat.

What is ? AN ECOSYSTEM?

A community of animals or plants in its surroundings is called an ecosystem. An ecosystem can be as small as a bush or a puddle, or as large as a forest or an ocean. Ecology starts with studying individuals – their size and shape, how they behave and what they need to survive. Ecologists gradually build up a picture of groups of animals and plants, and work out food webs made up of plants, herbivores and carnivores.

TOP DOG

Allosaurus was at the top of the food web during the Jurassic. Its strong arms and claws grabbed small prey and it used its huge jaws to tear apart larger victims. *Allosaurus* probably ate whatever meat it could find, including dead animals.

SMALLER AND FASTER

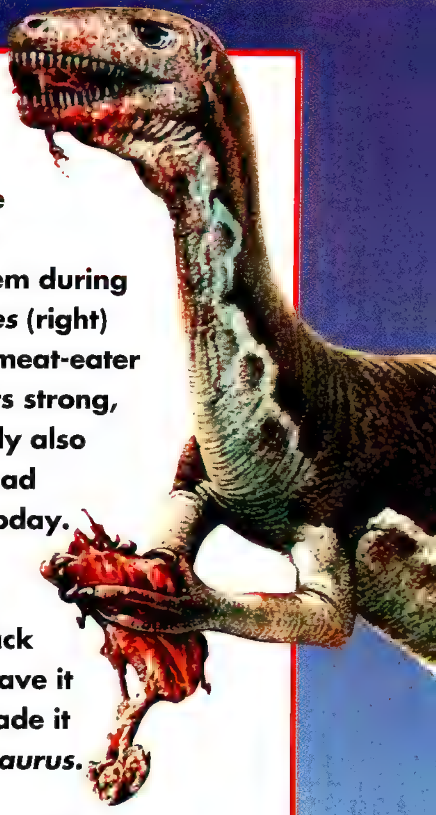
Ornitholestes was a smaller meat-eating dinosaur that lived among the larger Jurassic predators like *Allosaurus*. *Ornitholestes* relied on the speed of its long, slender legs to stay out of the way of larger predators, and to catch its prey of lizards and small mammals. Its sharp eyes helped it to spot and chase down prey.

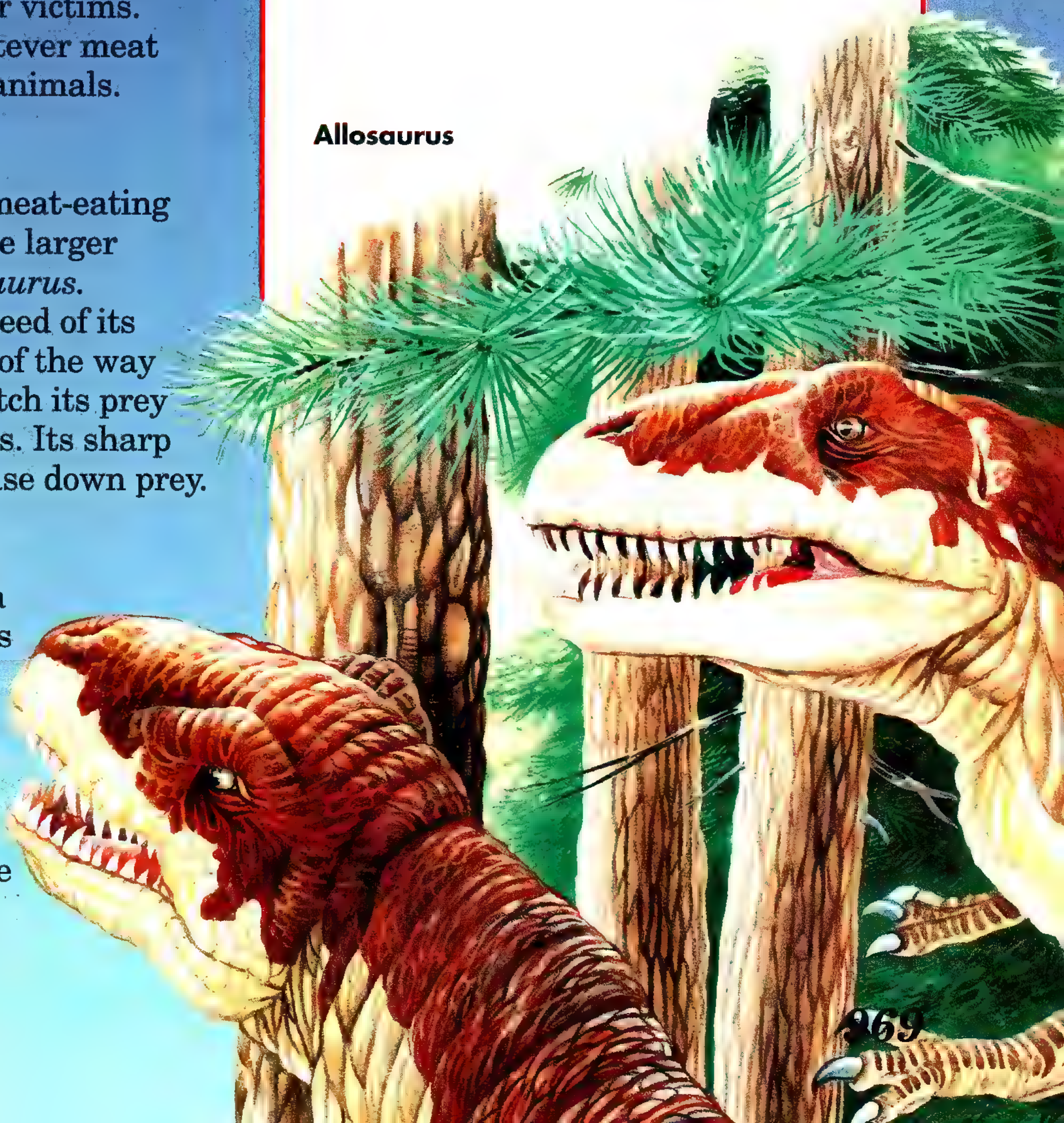
THEN AND NOW

The ecology of North America today is similar in many ways to its ecology during the Jurassic Period. Dinosaurs were reptiles, and today's prairie animals are mammals. But ecology can help us understand how those great reptiles, the dinosaurs, fed and bred, lived and died.

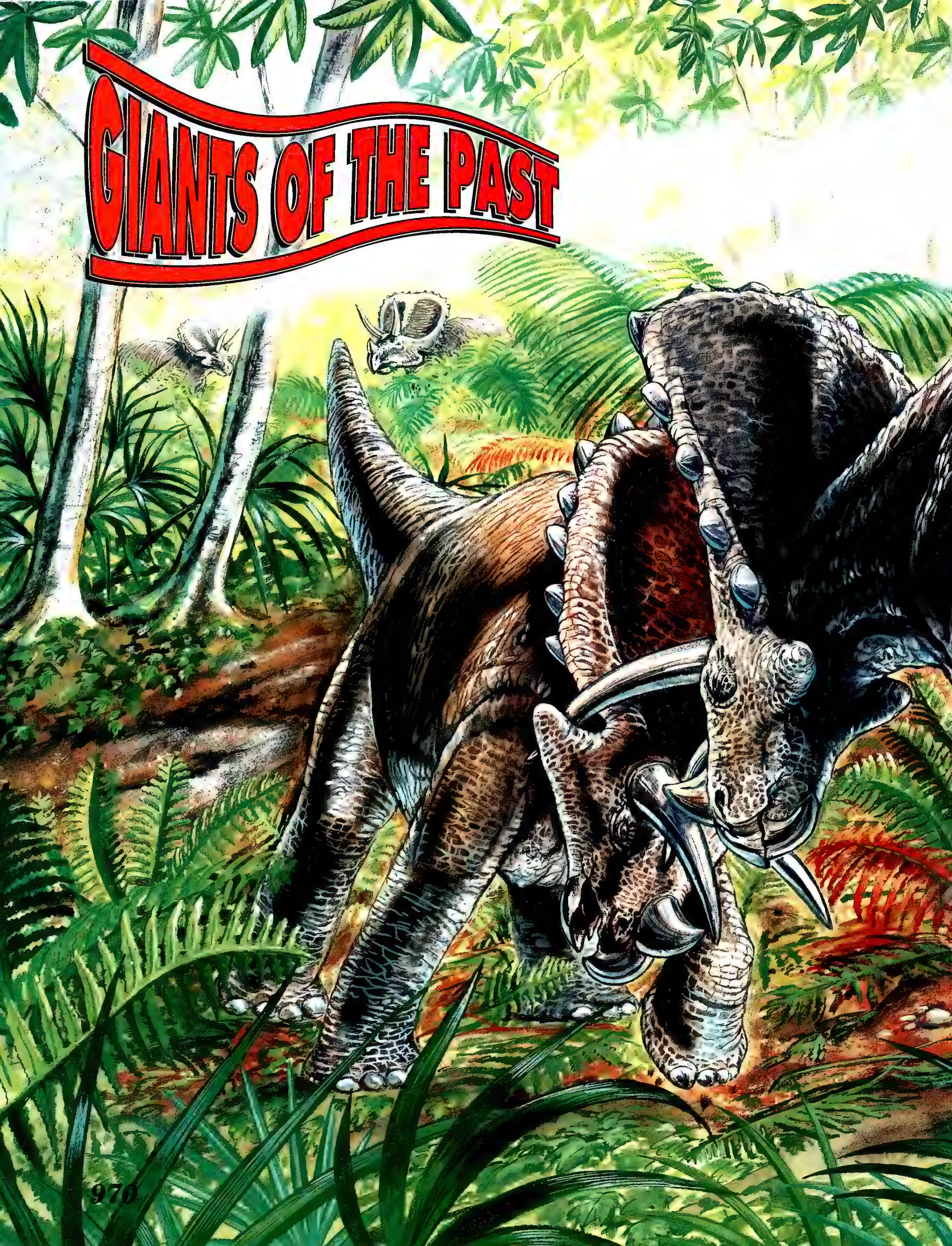
JURASSIC MEAT-EATERS

Two dinosaurs that were an important part of the North American ecosystem during the Jurassic: *Ornitholestes* (right) was a smallish, speedy meat-eater that gripped its prey in its strong, clawed hands. It probably also scavenged meat from dead animals, as coyotes do today. *Allosaurus* (below) ate both small animals and larger prey. Its strong back legs and balancing tail gave it a turn of speed which made it a serious threat to *Dryosaurus*.



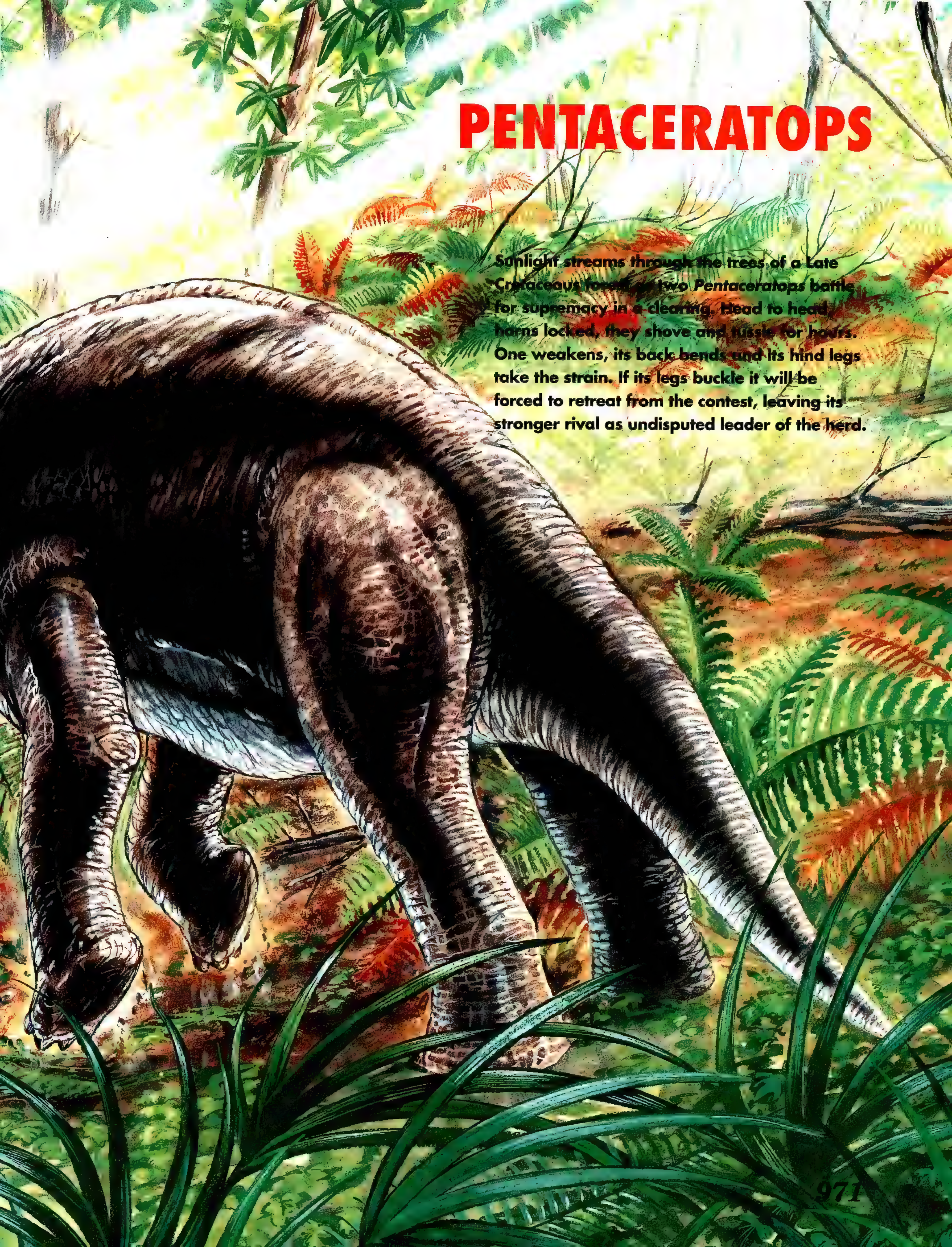


GIANTS OF THE PAST



PENTACERATOPS

Sunlight streams through the trees of a Late Cretaceous forest as two *Pentaceratops* battle for supremacy in a clearing. Head to head, horns locked, they shove and tussle for hours. One weakens, its back bends and its hind legs take the strain. If its legs buckle it will be forced to retreat from the contest, leaving its stronger rival as undisputed leader of the herd.



Worn out by their young, the adults of a herd of *Stegoceras* are taking an afternoon nap. As usual, their babies are full of beans. The young dinosaurs play at head-butting and learn how to become king of the herd when they grow up.

3-D Gallery 50

STEGOCERAS

Colours for courtship

Some animals use bright colours to attract a mate. Perhaps dinosaurs put on colourful displays too.

During the mating season, males of many species of animal change colour and put on spectacular displays. They do this to get the attention of females.

THE RIGHT PARTNER

A female needs a mate who is strong enough to fend off predators, find food and help her to take care of her young. It is up to the female to choose her partner. But how does she do this?

SONG AND DANCE ACT

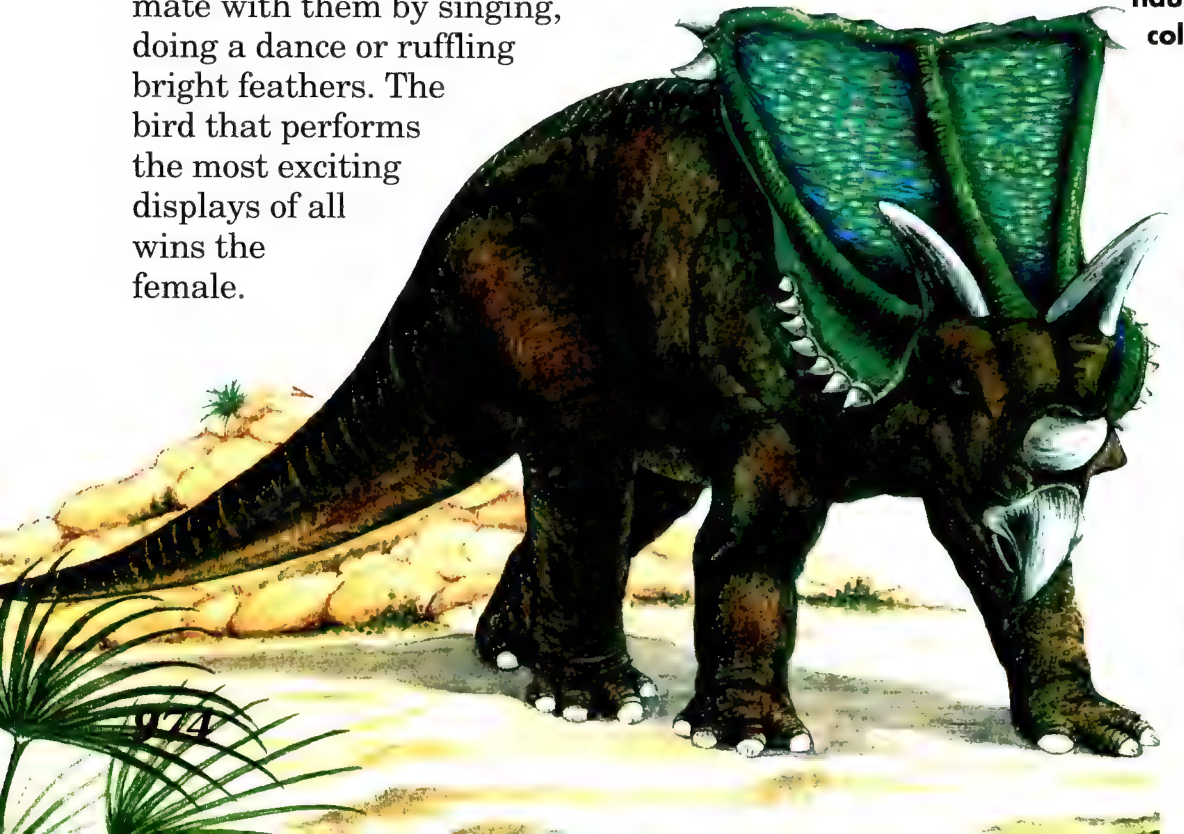
Most male birds try to persuade females to mate with them by singing, doing a dance or ruffling bright feathers. The bird that performs the most exciting displays of all wins the female.

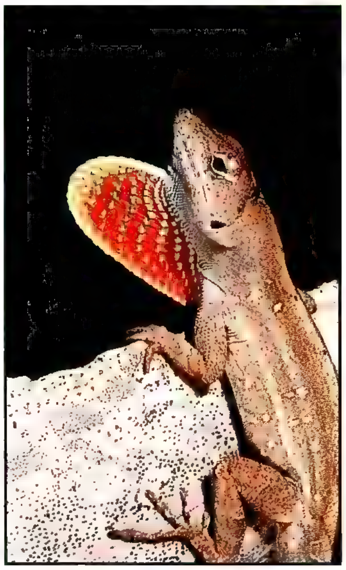
Male birds like this exotic pheasant display bright colours to attract females. Dinosaurs may have too.

CHANGING COLOURS

Many birds change colour at mating time. Some display to the female by waggling their bright crests, like the bright orange-crested cock of the rock. Others, like the puffin, wiggle their beaks, which turn bright red, just for the mating season. Some frogs have a sac of skin below their throat, from where they make their croaking sound. It turns blue at mating time.

An anolis lizard (below right) isn't ashamed of its double chin! It puffs out its throat fan for the females. Perhaps *Chasmosaurus* (below left) flaunted a colourful frill.





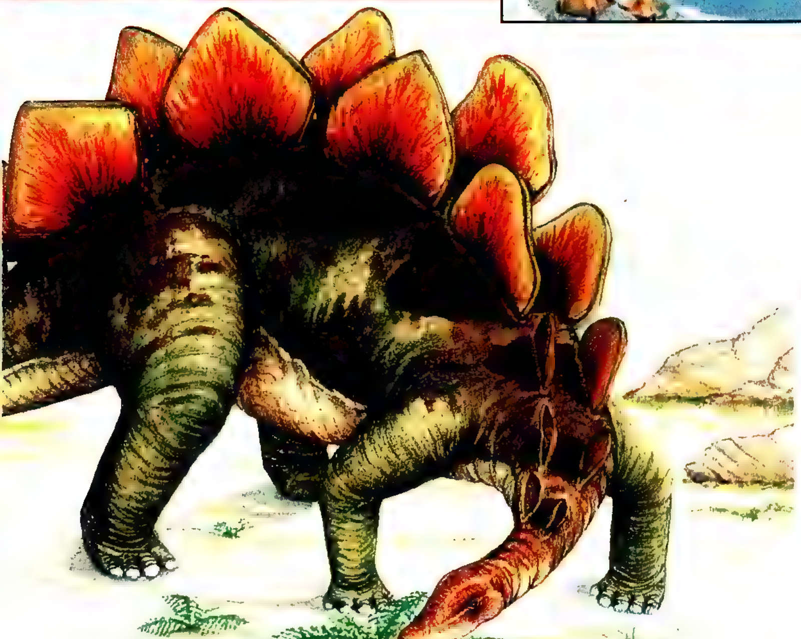
Did *Psittacosaurus'* beak (above) change colour for the breeding season? Puffins' bills turn bright red (right).

COLOUR CRAZY

With all their different frills, beaks and crests dinosaurs may have been all sorts of colours. Perhaps *Corythosaurus'* crest was normally green, but changed to bright blue at mating time. *Spinosaurus'* sail may have been many different colours and *Stegosaurus* may have changed the colour of its plates every time it wanted to mate. Beaked dinosaurs like *Psittacosaurus* may have attracted their females by changing the colour of their beaks, in the same way that puffins do.

PUFFING UP

Experts think hadrosaurs like *Edmontosaurus* and *Saurolophus* had flaps of skin over their nostrils which were brightly coloured at mating time. They inflated the flaps, just as today's bull elephant seal does.



If the huge plates on a male *Stegosaurus* (above) were brightly coloured, the plates could have helped *Stegosaurus* to warn off other males in the herd and to attract a mate.

DINOSAURS TOO

We do not know what colours dinosaurs were, because the colour from fossils vanished millions of years ago. Experts think male dinosaurs probably courted females with stunning visual displays, just like today's animals.

Perhaps male *Oviraptor* (above) attracted females by waving at them with a brightly-coloured crest – like today's cock of the rock (left).

Attack

Meat-eating dinosaurs were built to kill. The largest and fiercest were among the most deadly hunters that ever lived on Earth.

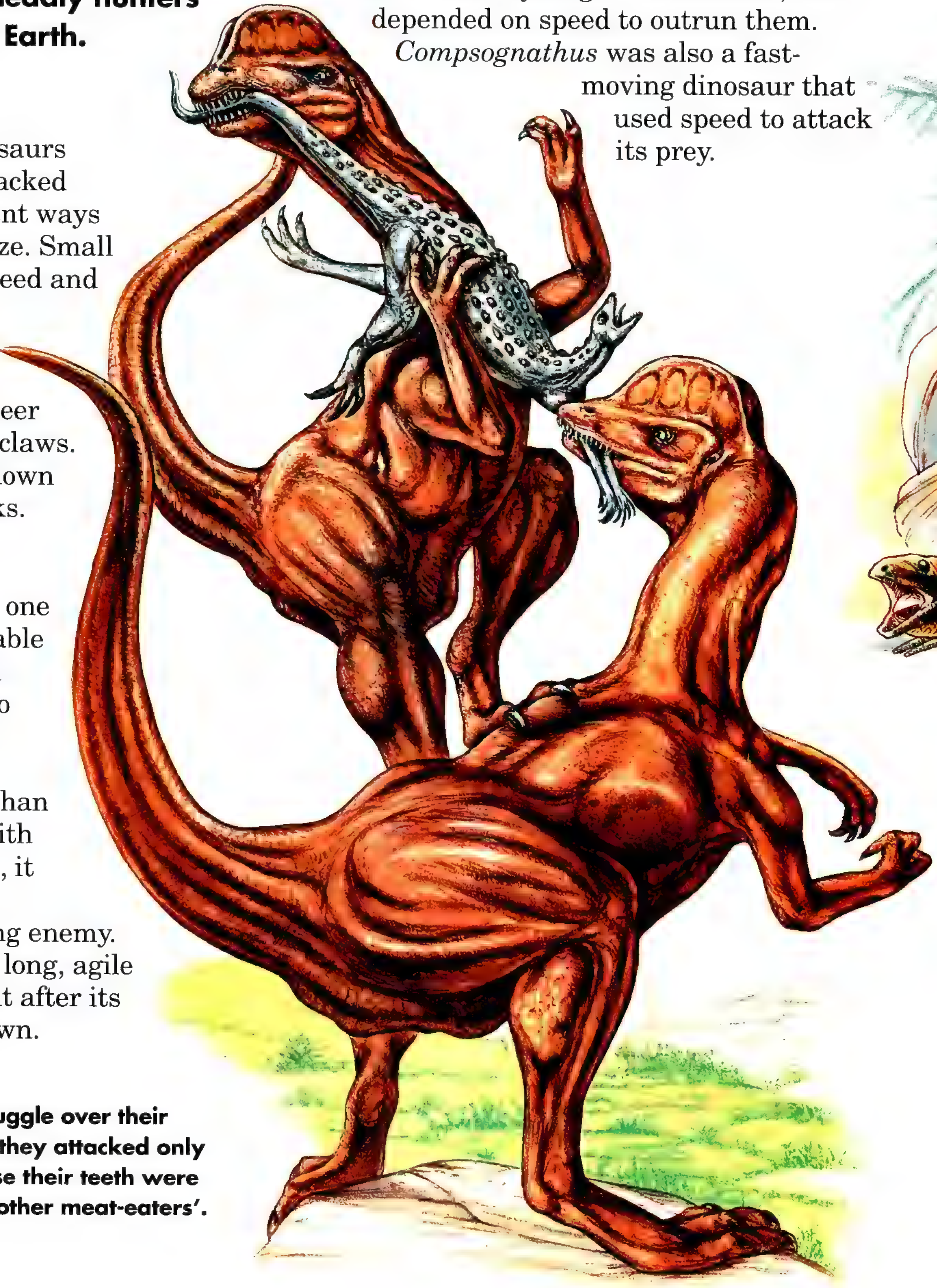
Dinosaurs attacked in different ways according to their size. Small hunters relied on speed and sharp teeth to catch and kill their prey. Larger meat-eaters used sheer power and slashing claws. Some even hunted down their victims in packs.

FIRST HUNTER

Staurikosaurus was one of the first hunters able to run down and kill big game. It was also one of the earliest dinosaurs yet discovered. Longer than a man and armed with sharp, pointed teeth, it must have been an extremely frightening enemy. *Staurikosaurus* had long, agile legs so it could sprint after its prey and bring it down.

SPEED KILLS

The small hunters relied on their speed to make a kill. The speediest killer was probably *Dromiceiomimus*, which lived on lizards and insects. It could chase after its prey at a lightning 60km/h which is faster than a racing greyhound. *Dromiceiomimus* was hunted by larger meat-eaters, and it depended on speed to outrun them. *Compsognathus* was also a fast-moving dinosaur that used speed to attack its prey.



Two *Dilophosaurus* struggle over their prey. It is thought that they attacked only small dinosaurs because their teeth were not as strong as some other meat-eaters'.

MEAT SLICERS

Teeth provide some of the best clues to how an animal attacked. Today big cats kill by digging their four fangs, or canines, deep into their prey. But dinosaurs had no canine fangs. The small hunter *Coelophysis* had one of the most lethal bites. Its dagger-like teeth were designed to slash through flesh, not puncture it. Some modern reptiles have a similar slashing bite. With their slashing teeth Komodo dragons can kill cows and even kill people.

Coelophysis **(right) slashed its prey with a mouth full of saw-edged teeth. Its victims bled to death.**

Attacking with speed: *Compsognathus* (left) caught prey by being able to run fast. Today's cheetah (above) uses speed too.

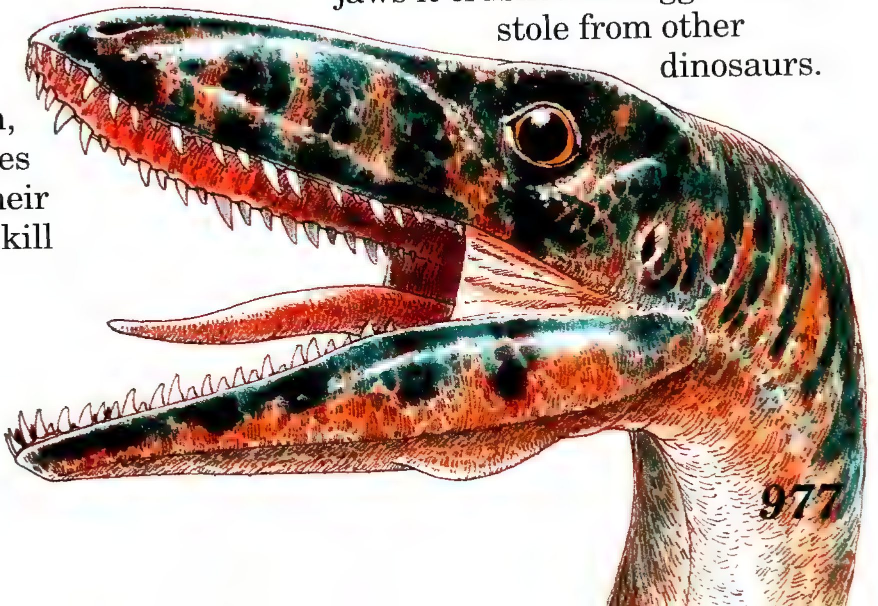
IT'S A FACT

BRAIN POWER

Quick wits were vital weapons, too. The most intelligent hunter was *Troodon*. It used its brain power to track and kill small, hidden prey.

CRUSHING BITE

Not all meat-eating dinosaurs were hunters. *Oviraptor*, the 'egg thief', needed different weapons to attack its food. Instead of rows of sharp teeth to tear up its meat it had just two prongs in the roof of its mouth. Using the prongs and powerful jaws it crushed the eggs that it stole from other dinosaurs.



TERROR TACTICS

Tyrannosaurus rex was the giant of the meat-eating dinosaurs. It was too big to chase its prey over long distances. But it sometimes found its next meal in an easier way. *T rex* frightened other meat-eaters away from their prey. Once it had driven them off, *T rex* could feast on what they had killed. Today, big hunters, such as lions, use the same tactics to get an easy meal.

Is it true that *Tyrannosaurus* had a secret weapon?

Yes, it might be. Some experts think that the giant hunter could have killed its prey by spreading disease. They think it might have had shreds of rotting meat stuck in its teeth, which infected the wounds it made when it bit its victims. The infection quickly spread and its prey soon died.

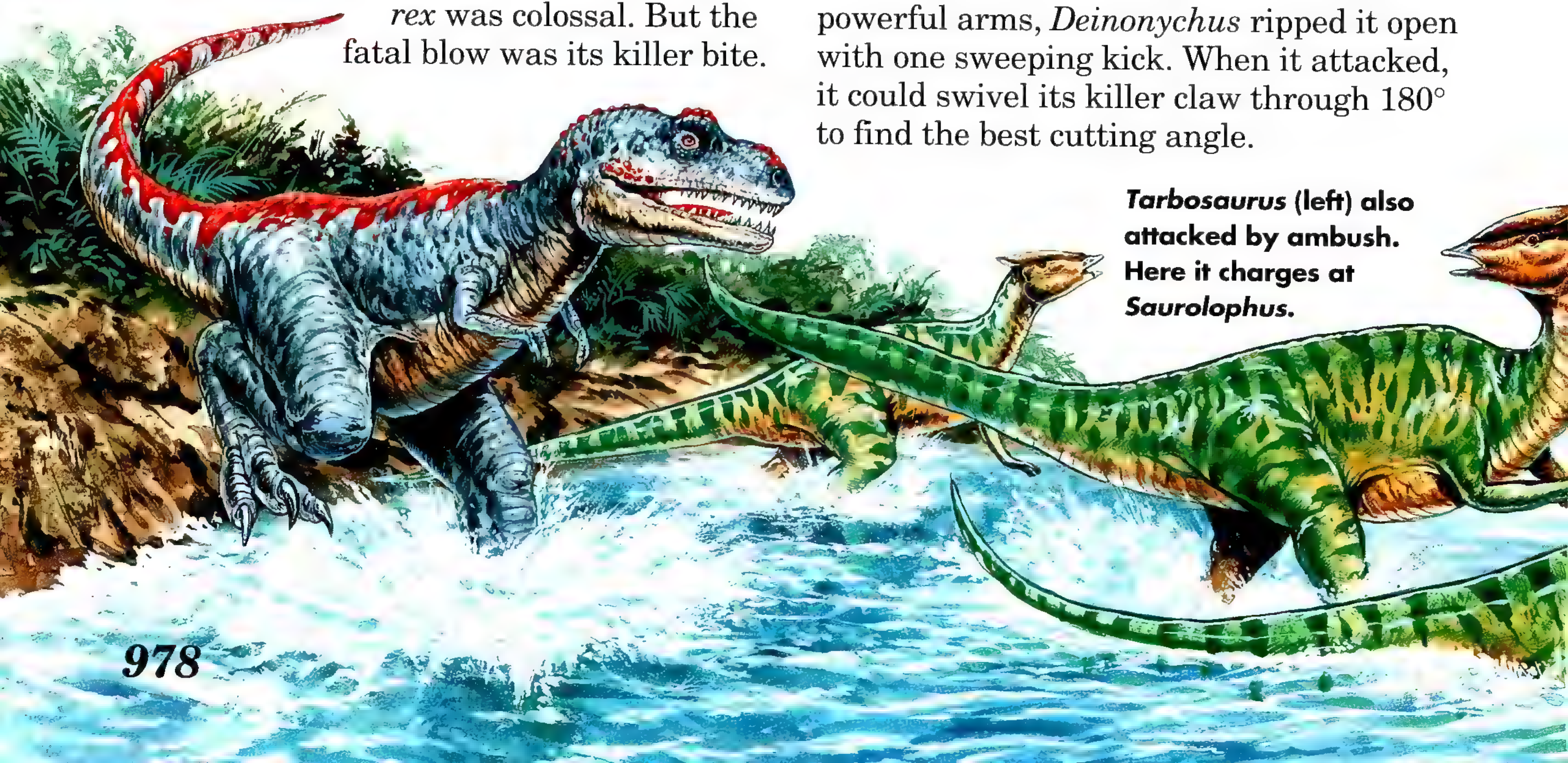
Mouth agape, *T rex* charges at its defenceless victim *Corythosaurus*.

CHARGE!

T rex was a deadly hunter. Using its skills as a tracker, it crept up on its prey. Then it charged in a short and fatal headlong rush. The mighty meat-eater crashed into its victim with its huge, fearsome jaws gaping wide. The shock of being hit by *T rex* was colossal. But the fatal blow was its killer bite.

SLASHING CLAWS

One of the most successful hunters was *Deinonychus*. It combined speed and agility with fearsome weaponry. Its most lethal weapon was the second claw on the hind foot, which acted like a crescent-shaped slashing knife. Grabbing its victim in its powerful arms, *Deinonychus* ripped it open with one sweeping kick. When it attacked, it could swivel its killer claw through 180° to find the best cutting angle.

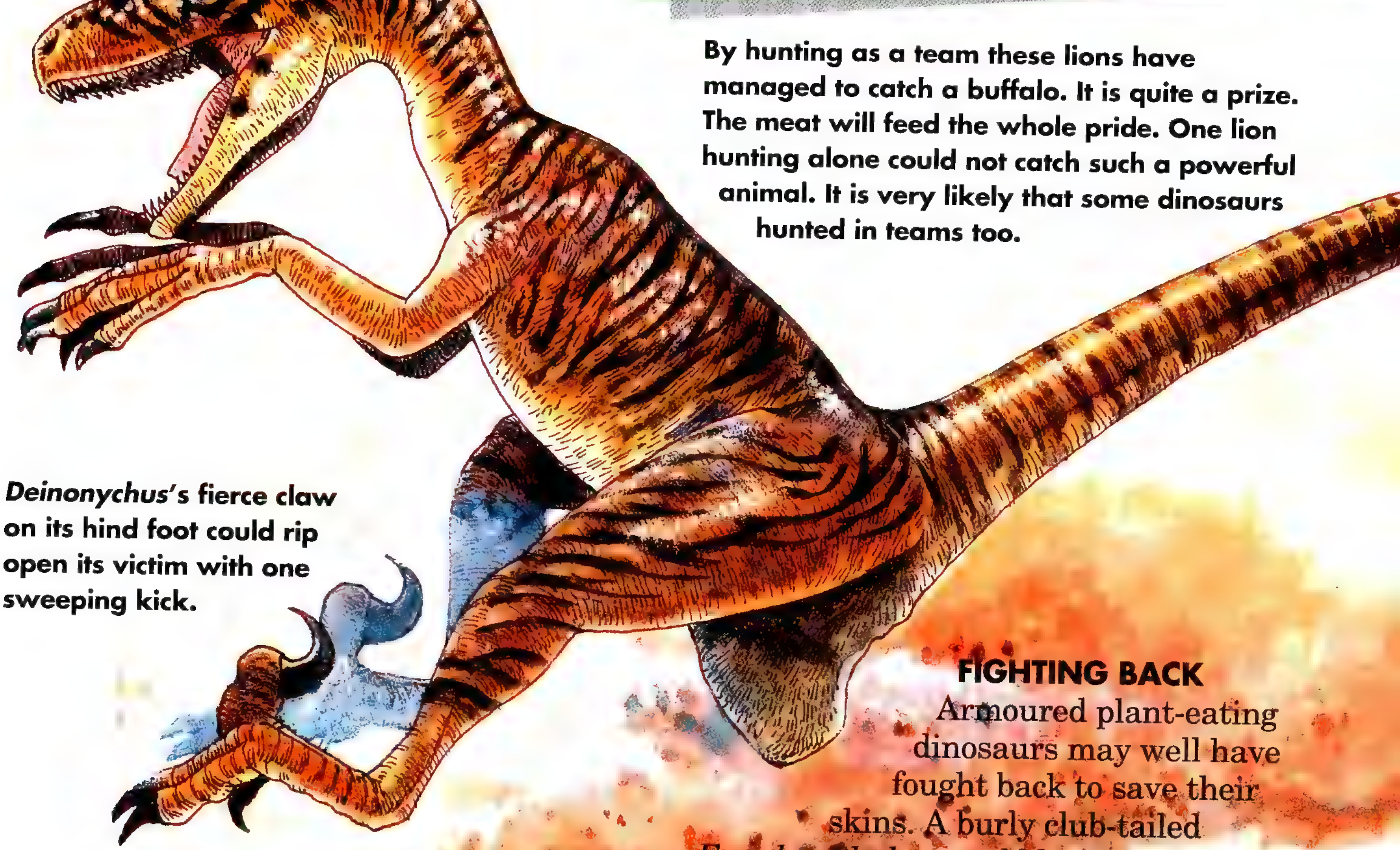


***Tarbosaurus* (left) also attacked by ambush. Here it charges at *Saurolophus*.**

PACK ATTACK

Deinonychus may also have hunted in a pack. Working as a team, they could have toppled a dinosaur much larger than themselves. Today, a pride of lions can work together to bring down game in much the same way. Large meat-eating dinosaurs, such as *Allosaurus*, may also have attacked as a pack. They might even have tackled massive sauropods.

By hunting as a team these lions have managed to catch a buffalo. It is quite a prize. The meat will feed the whole pride. One lion hunting alone could not catch such a powerful animal. It is very likely that some dinosaurs hunted in teams too.

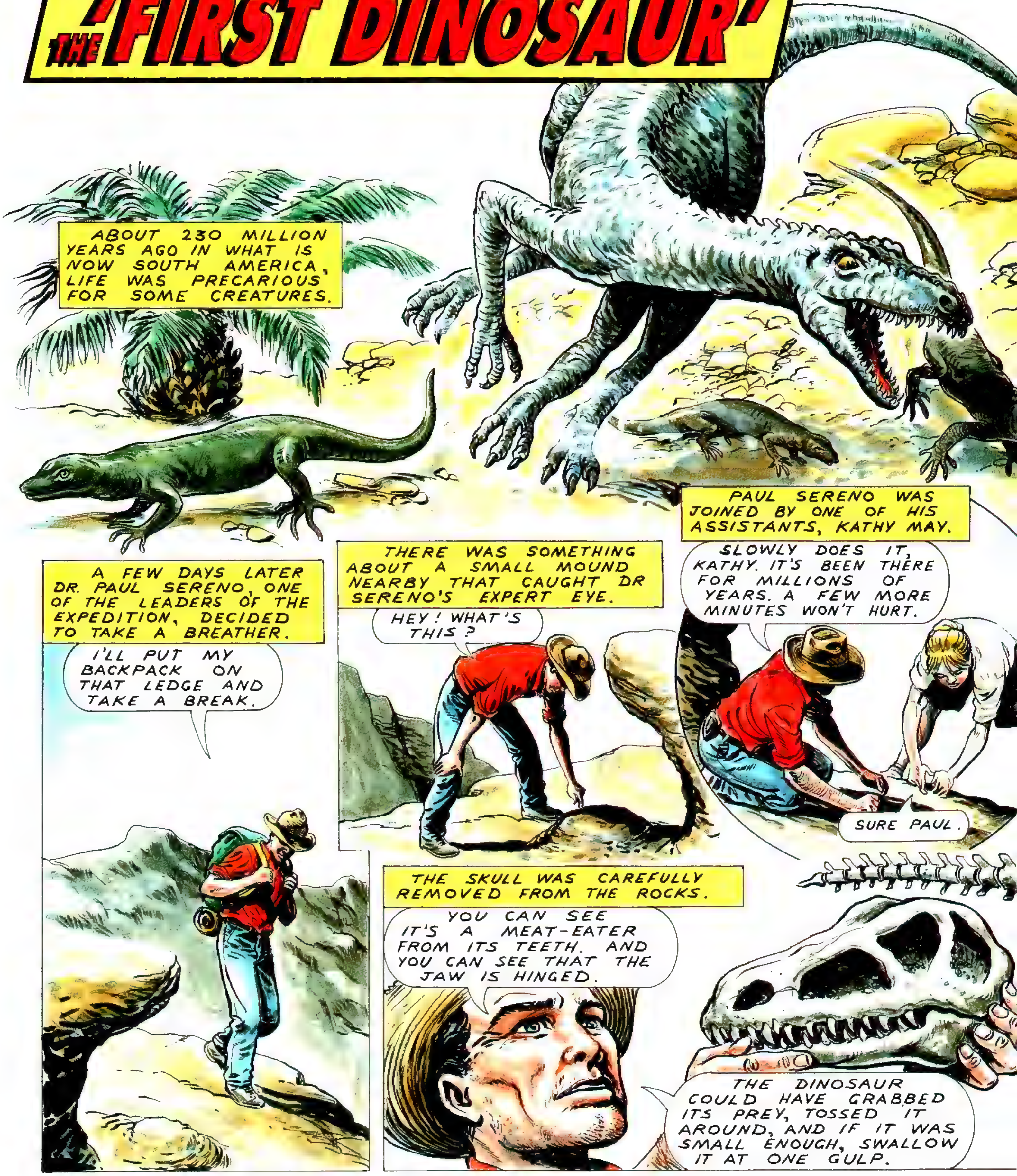


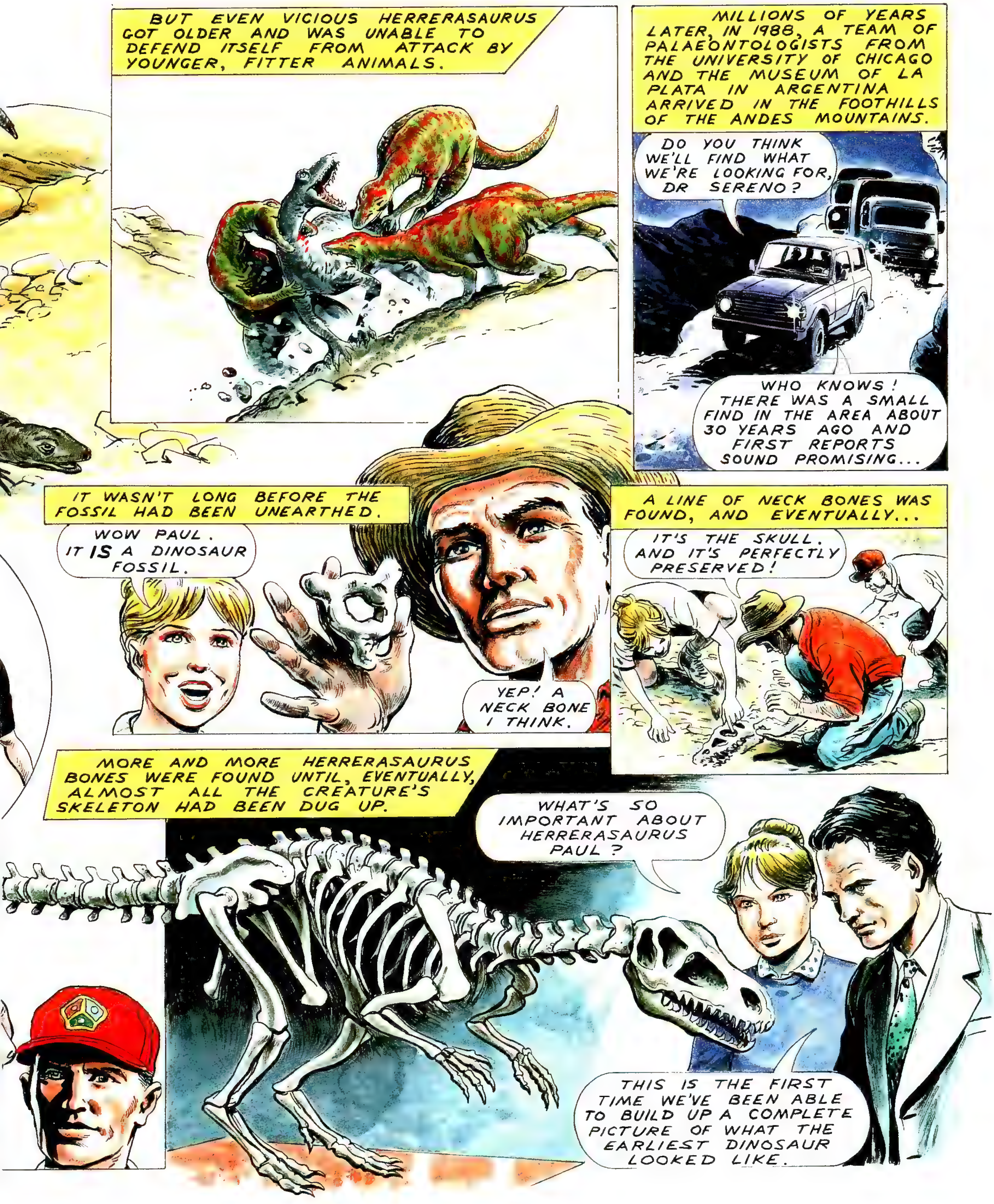
***Deinonychus*'s fierce claw on its hind foot could rip open its victim with one sweeping kick.**

FIGHTING BACK

Armoured plant-eating dinosaurs may well have fought back to save their skins. A burly club-tailed *Euoplocephalus* would have made a nasty enemy. One well-aimed blow from its heavy tail club could have sent a tyrannosaur crashing to the ground. A horned plant-eater, such as *Triceratops*, could also put up a good fight. It might have charged its attacker, just as a modern rhinoceros might defend itself against a lion. Its long, curved horns made it a fearsome adversary.

THE 'FIRST DINOSAUR'


ABOUT 230 MILLION YEARS AGO IN WHAT IS NOW SOUTH AMERICA, LIFE WAS PRECARIOUS FOR SOME CREATURES.
A FEW DAYS LATER DR. PAUL SERENO, ONE OF THE LEADERS OF THE EXPEDITION, DECIDED TO TAKE A BREATHER.
I'LL PUT MY BACKPACK ON THAT LEDGE AND TAKE A BREAK.
THERE WAS SOMETHING ABOUT A SMALL MOUND NEARBY THAT CAUGHT DR SERENO'S EXPERT EYE.
HEY! WHAT'S THIS?
PAUL SERENO WAS JOINED BY ONE OF HIS ASSISTANTS, KATHY MAY.
SLOWLY DOES IT, KATHY. IT'S BEEN THERE FOR MILLIONS OF YEARS. A FEW MORE MINUTES WON'T HURT.
SURE PAUL.
THE SKULL WAS CAREFULLY REMOVED FROM THE ROCKS.
YOU CAN SEE IT'S A MEAT-EATER FROM ITS TEETH. AND YOU CAN SEE THAT THE JAW IS HINGED.
THE DINOSAUR COULD HAVE GRABBED ITS PREY, TOSSED IT AROUND, AND IF IT WAS SMALL ENOUGH, SWALLOW IT AT ONE GULP.


BUT EVEN VICIOUS HERRERASAURUS GOT OLDER AND WAS UNABLE TO DEFEND ITSELF FROM ATTACK BY YOUNGER, FITTER ANIMALS.
MILLIONS OF YEARS LATER, IN 1988, A TEAM OF PALAEONTOLOGISTS FROM THE UNIVERSITY OF CHICAGO AND THE MUSEUM OF LA PLATA IN ARGENTINA ARRIVED IN THE FOOTHILLS OF THE ANDES MOUNTAINS.
DO YOU THINK WE'LL FIND WHAT WE'RE LOOKING FOR, DR SERENO?
WHO KNOWS! THERE WAS A SMALL FIND IN THE AREA ABOUT 30 YEARS AGO AND FIRST REPORTS SOUND PROMISING...
IT WASN'T LONG BEFORE THE FOSSIL HAD BEEN UNEARTHED.
WOW PAUL. IT **IS** A DINOSAUR FOSSIL.
YEP! A NECK BONE I THINK.
A LINE OF NECK BONES WAS FOUND, AND EVENTUALLY...
IT'S THE SKULL. AND IT'S PERFECTLY PRESERVED!
MORE AND MORE HERRERASAURUS BONES WERE FOUND UNTIL, EVENTUALLY, ALMOST ALL THE CREATURE'S SKELETON HAD BEEN DUG UP.
WHAT'S SO IMPORTANT ABOUT HERRERASAURUS PAUL?
THIS IS THE FIRST TIME WE'VE BEEN ABLE TO BUILD UP A COMPLETE PICTURE OF WHAT THE EARLIEST DINOSAUR LOOKED LIKE.

Improve and test your knowledge with...

DINO Fact File

Climb down *Diplodocus'* neck answering the questions as you go.

3 Which dinosaur was a small, speedy hunter?

a) *T rex*
b) *Corythosaurus*
c) *Dromiceiomimus*

4 What did *Deinonychus* use as a lethal weapon?

a) a large claw on its hind foot
b) a sharp horn on its head
c) poisonous fangs

5 *Riojasaurus* was named after:

a) a city
b) a temple
c) a mountain

6 *Adasaurus* was closely related to:

a) savage *Velociraptor*
b) well-armoured *Ankylosaurus*
c) egg-eating *Oviraptor*

7 What sort of dinosaur was *Saurornithoides?*

a) intelligent and quick
b) slow and stupid
c) slow but intelligent

8 *Herrerasaurus* was one of the:

a) biggest dinosaurs
b) earliest dinosaurs
c) fastest dinosaurs

9 Dinosaurs might have attracted a mate by:

a) changing colour
b) dancing in the moonlight
c) flapping their wings

10 Who found the very first *T rex* fossil?

a) Tim Rex
b) David Norman
c) Barnum Brown

Hard labour

It took five people three years to clean a single tyrannosaur fossil. That's 30,000 hours of hard work!

Famous first

The very first T rex was found in 1900 in Wyoming, USA, by the famous palaeontologist Barnum Brown. The skeleton, made up of some original bones and some cast bones, was on display in the Natural History Museum in London, England, for about 30 years.

Lucky find

For Karl Hirsch, fossil hunting used to be a summer hobby. But all that changed the day he found a dinosaur egg. Now he is an expert in identifying and researching these unusual fossil eggs.

2 How many horns did *Pentaceratops* have?

a) five
b) ten
c) three

1 Which dinosaur was a Jurassic plant-eater?

a) *Allosaurus*
b) *Ornitholestes*
c) *Camptosaurus*

Ruling reptiles

Dinosaurs and pterosaurs are classified as archosaurs, which means 'ruling reptiles'. The only archosaurs alive today are crocodiles and birds.

Star name

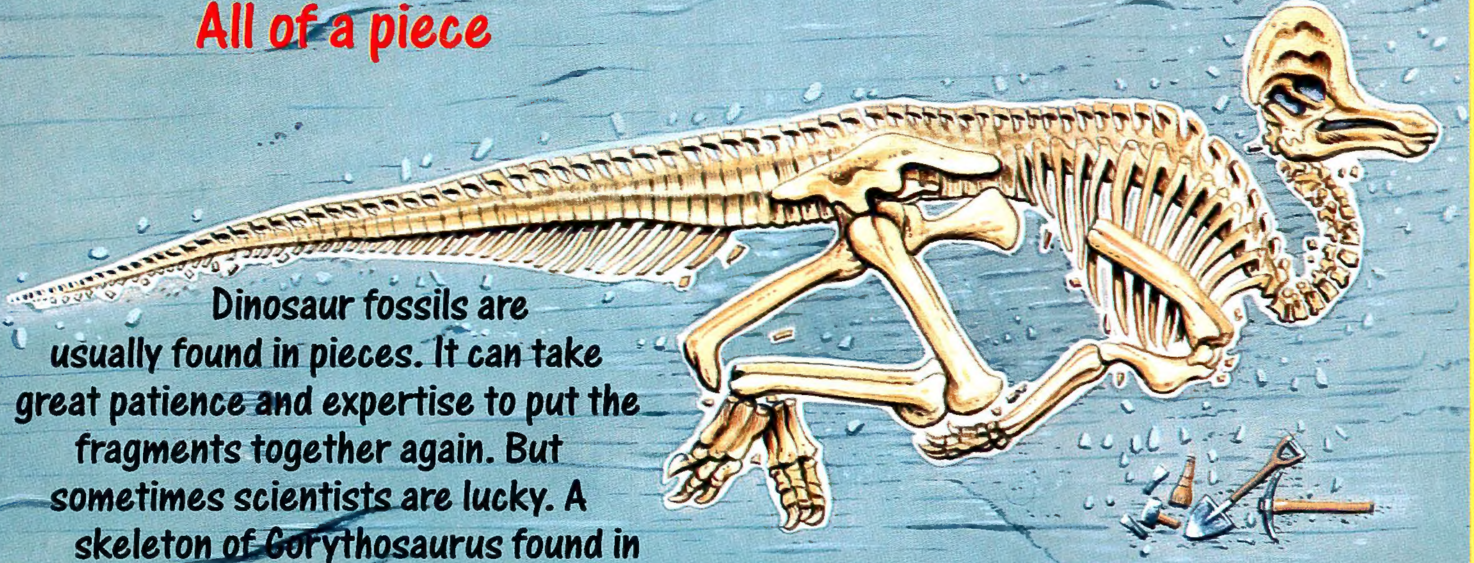
One of the earliest-known ankylosaurs has been called Jurassosaurus nedegoapeferkimorum, after the Steven Spielberg film, Jurassic Park. Its weird species name uses the first letters of the surnames of people who starred in the film.

Triassic hippo

Lystrosaurus was a 2m-long, mammal-like reptile that looked a bit like a hippopotamus. It became extinct just as the first dinosaurs appeared on Earth. Fossils of this sturdy beast have been found in South Africa, India and Antarctica – more evidence that these continents were once joined together.

All of a piece

Dinosaur fossils are usually found in pieces. It can take great patience and expertise to put the fragments together again. But sometimes scientists are lucky. A skeleton of Corythosaurus found in Alberta, Canada, was completely intact.

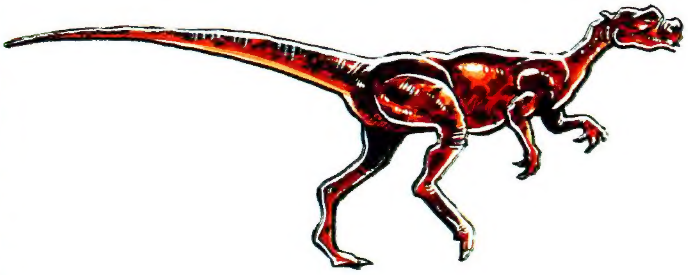


Corythosaurus

Answers to the questions on inside back cover

SARCOSAURUS 190 MYA

Sarcosaurus (sar-koh-saw-rus) is known from some back, hip and leg bones which were found in Leicestershire, England. It was a lightly built meat-eating dinosaur which ran swiftly on two legs. About as long as a car, *Sarcosaurus* lived in the Early Jurassic. Its name means 'flesh reptile'.



SAUROLOPHUS 70 MYA

Duckbilled *Saurolophus* (saw-roh-loh-fus) grew to be as long as a tennis court is wide. It lived in Canada and Mongolia in the Late Cretaceous Period. *Saurolophus* had a crest, which ran backwards from its skull, and a broad, toothless beak. Its name means 'ridged reptile' after the bony ridge on the top of its skull. Experts think it may have had a pouch of loose skin over its snout which it inflated like the nose of an elephant seal.

SAUROPELTA 110 MYA

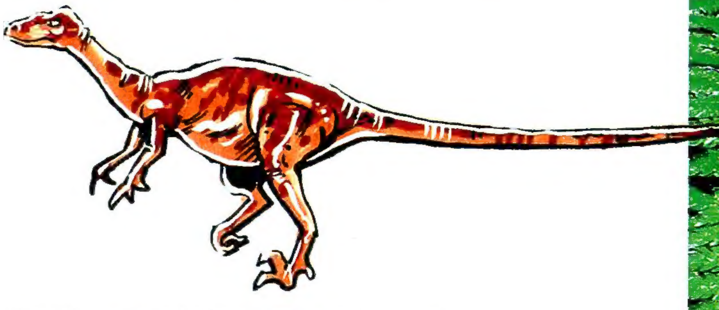
As long as a large elephant, *Sauropelta* (saw-roh-pel-ta) lived in Montana, USA. Its name means 'reptile shield' and although it did not have a tail club, *Sauropelta* had bony plates, spikes and spines which covered the whole of the top half of its body. *Sauropelta* used its flexible shoulder muscles to draw in its arms when threatened. It could also lunge forward in a sudden counter-attack.

SAUROPLITES 120 MYA

A four-legged plant-eater, *Sauroplites* (saw-roh-pleet-ees) was an ankylosaur that lived in the Early Cretaceous Period. It was found in the Gansu Province in China and grew to be as long as 6m. *Sauroplites* was named 'reptile hoplite' after the heavily-armoured foot soldiers of Ancient Greece.

SAURORNITHOIDES 80 MYA

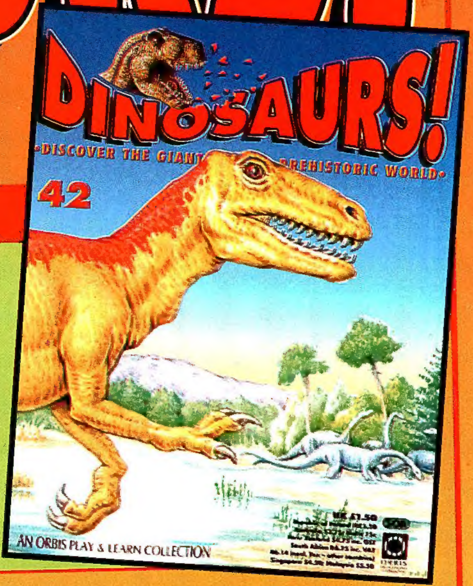
Saurornithoides (saw-ror-nith-oid-ees) was an agile, intelligent dinosaur. It darted around on two legs to catch its prey – mostly small mammals. It had big eyes set in its long, low head and some experts think it could see in the dark. *Saurornithoides'* speed and brains meant it could outsmart many bigger beasts. It also had a lethal weapon on each foot – a large, curved claw. Its name means 'bird-like reptile' and parts of its skull, backbone, hips and hind legs were found in the Gobi Desert, Mongolia in 1923.



MYA = MILLION YEARS AGO

COMING IN PART 42 OF

DINOSAURS!


DINOSAURS!
•DISCOVER THE GIANT REHISTORIC WORLD•
42
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What do humans, hamsters and Triceratops have in common? Find out in SPOTTER'S GUIDE. See how dinosaurs defended themselves in TIME DETECTIVE.

PLUS

IDENTIKIT investigates the lives of three more exciting dinosaurs
and
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GIANTS OF THE PAST
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Have you ever wanted to fill your room with dinosaurs? Now you have your chance – with the *Dinosaurs!* POSTER COLLECTION. Each poster is 820 x 570mm (nearly eight times the size of this page) and features a superb dinosaur artwork. You'll find facts and figures about the dinosaur on the back – PLUS a look at some other prehistoric animals. The 12th poster is *Brachiosaurus*.

ANSWERS TO DINO FACT FILE QUESTIONS: 1.c 2.c 3.c 4.a 5.a 6.a 7.a 8.b 9.a 10.c

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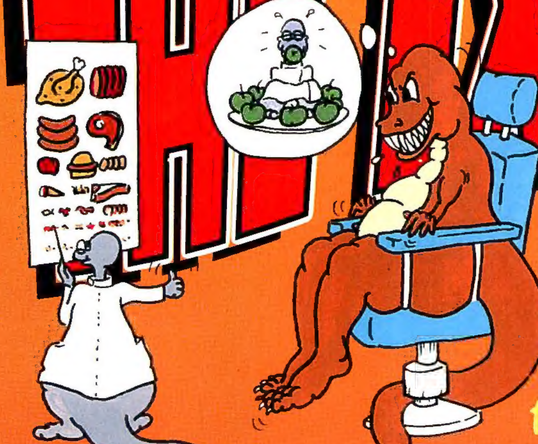
ASK THE EXPERT

Dr. David Norman of Cambridge University answers your dinosaur questions

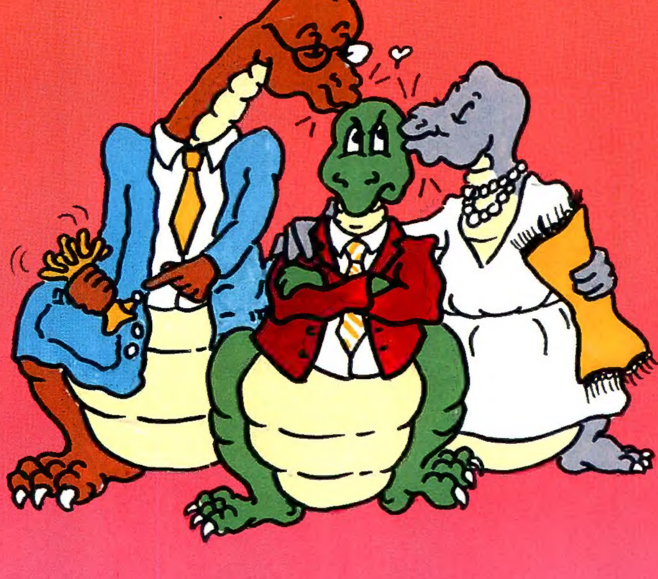


Did T rex have good eyesight?

Yes, we believe so. *T rex'* eye sockets were very large, which shows that the dinosaur's eyes were well developed and it could see well. Its eyes were forward facing, like humans' eyes. Having our eyes in this position means that we can judge how far away things are – and so could *T rex*. It could therefore pick out its prey very easily and accurately.

Did baby dinosaurs stay with their parents?

We know that some dinosaur babies stayed near their parents because their fossilized bones have been found inside nests. The fossils show us that the babies were fed by their parents inside the nest. When they left the nest the babies stayed with their parents until they could fend for themselves.

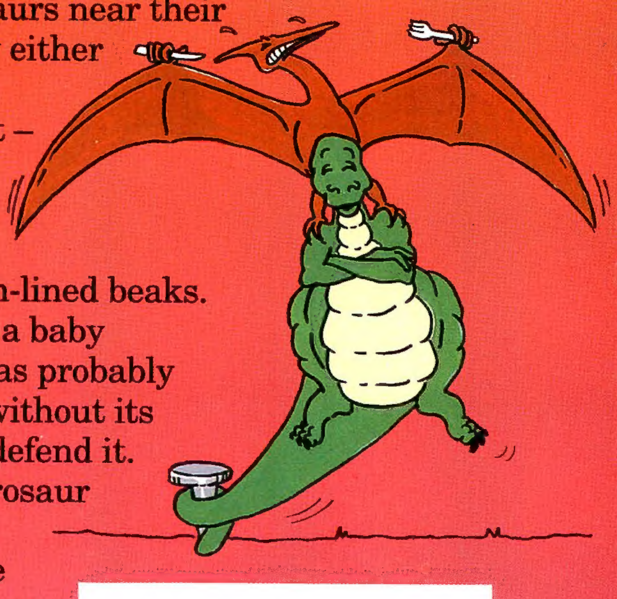


Did dinosaurs have frills like lizards?

There is no evidence that any dinosaur had a neck frill similar to that of the Australian frilled lizard. So although some dinosaurs have been portrayed in films with lizard-like neck frills, there is no factual basis for this dramatic effect.

Did pterosaurs attack and eat dinosaurs?

I think it is very unlikely that pterosaurs attacked adult dinosaurs. However, some of the larger pterosaurs may have killed baby dinosaurs near their nests. They either used their taloned feet – as an eagle might – or even their sharp, tooth-lined beaks. Sometimes a baby dinosaur was probably left alone, without its parents to defend it. Then a pterosaur could have grabbed the baby dinosaur and found itself a tasty meal.



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